Methylation of the retinoblastoma tumor suppressor by SMYD2.

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Public Summary:

Scientific Abstract:
The retinoblastoma tumor suppressor (RB) is a central cell cycle regulator and tumor suppressor. RB cellular functions are known to be regulated by a diversity of post-translational modifications such as phosphorylation and acetylation, raising the possibility that RB may also be methylated in cells. Here we demonstrate that RB can be methylated by SMYD2 at lysine 860, a highly conserved and novel site of modification. This methylation event occurs in vitro and in cells, and it is regulated during cell cycle progression, cellular differentiation, and in response to DNA damage. Furthermore, we show that RB monomethylation at lysine 860 provides a direct binding site for the methyl-binding domain of the transcriptional repressor L3MBTL1. These results support the idea that a code of post-translational modifications exists for RB and helps guide its functions in mammalian cells.